

AMENDMENT TO CLAIMS

Please amend claims 4, 11, 14-15, and 17-23 as following:

1. *(Previously amended)* A transmitter operating in a switching-mode, the transmitter comprising:
 - a signal decomposition unit decomposing a modulated digital signal into a first signal and a second signal, both being expressed in polar coordinates;
 - an adaptive predistorter distorting the first and second signals respectively in accordance with one or more of distorting parameters;
 - a phase equalizer equalizing a time delay between the first and second signals in response to a measurement provided by a feedback loop operating on a sample of a RF signal from the transmitter; and
 - a power amplifier, controlled by the first signal and a phase-modulated signal coupled from a voltage controlled oscillator, producing the RF signal.
2. *(Original)* The transmitter of claim 1, wherein the modulated digital signal is provided from a baseband processor, the first signal is an amplitude signal, and the second signal is a phase signal, and the phase-modulated signal is produced from the second signal.
3. *(Original)* The transmitter of claim 2, wherein the feedback loop includes a down-converter, a demodulation unit and a measurement unit, and provides feedback signals to at least the phase equalizer.
4. *(Currently amended)* The transmitter of claim 3, ~~wherein the down converter converts the sample to a lower frequency to be demodulated in the demodulation unit, and the demodulated sample is measured in the measurement unit for producing the feedback signals~~ further comprising converting the sample to a lower frequency to be demodulated in the demodulation unit to produce a demodulated sample, wherein the

demodulated sample is measured in the measurement unit for producing the feedback signals.

5. *(Original)* The transmitter of claim 1, wherein the first signal is provided to indirectly control the power amplifier.
6. *(Original)* The transmitter of claim 5, wherein the first signal activates a control unit to generate a bias control signal and a voltage signal in response to the first signal.
7. *(Original)* The transmitter of claim 5, further comprising a first modulation path and a second modulation path, both operating on the second signal.
8. *(Original)* The transmitter of claim 7, wherein the first modulation path provides a first input signal to the voltage controlled oscillator in response to the second signal processed in a phase gain unit.
9. *(Original)* The transmitter of claim 8, wherein the second signal, after processed in the phase gain unit, is converted to an analog signal.
10. *(Previously amended)* The transmitter of claim 8, wherein the second modulation path provides a second input signal to the voltage controlled oscillator in response to the second signal processed in a phase offset unit.
11. *(Currently amended)* The transmitter of claim 10, ~~wherein the second modulation path is formed by a phase-locked loop (PLL) including an adder that couples both the first input signal and second input signal to modulate the voltage controlled oscillator.~~
further comprising coupling an output of a loop filter with an output of a phase gain together to modulate the voltage controlled oscillator.
12. *(Previously amended)* A method for controlling a transmitter to operate in a switching-mode, the method comprising:

decomposing a modulated digital signal into a first signal and a second signal, both being expressed in polar coordinates;
distorting the first and second signals respectively in accordance with one or more of distorting parameters;
equalizing a time delay between the first and second signals in response to a measurement provided by a feedback loop operating on a sample of a RF signal from the transmitter; and
producing the RF signal in a power amplifier controlled by the first signal and a control signal coupled from a voltage controlled oscillator.

13. *(Original)* The method of claim 12, wherein the modulated digital signal is provided from a baseband processor, the first signal is an amplitude signal, and the second signal is a phase signal, and the control signal is produced from the second signal.

14. *(Currently amended)* The method of claim 12, ~~wherein the feedback loop includes a down-converter, a demodulation unit and a measurement unit, and provides feedback signals to at least a phase equalizer~~ further comprising providing feedback signals by the feedback loop to at least a phase equalizer, the feedback loop formed by a down-converter, a demodulation unit and a measurement unit.

15. *(Currently amended)* The method of claim 14, ~~wherein the down-converter converts the sample to a lower frequency to be demodulated in the demodulation unit, and the demodulated sample is measured in the measurement unit for producing the feedback signals~~ further comprising converting the sample to a lower frequency to be demodulated in the demodulation unit to produce a demodulated sample, wherein the demodulated sample is measured in the measurement unit for producing the feedback signals.

16. *(Original)* The method of claim 12, wherein the first signal is provided to indirectly control the power amplifier.

17. *(Currently amended)* The method of claim 16, ~~wherein the first signal activates a control unit to generate a bias control signal and a voltage signal in response to the first signal~~ further comprising activating a control unit by the first signal to generate a bias control signal and a voltage signal in response to the first signal.

18. *(Currently amended)* The method of claim 16, ~~wherein the transmitter comprises a first modulation path and a second modulation path, both operating on the second signal~~ further comprising a first modulation path and a second modulation path, both operating on the second signal.

19. *(Currently amended)* The method of claim 18, ~~wherein the first modulation path provides a first input signal to the voltage controlled oscillator in response to the second signal processed in a phase gain unit~~ further comprising providing a first input signal by the first modulation path to the voltage controlled oscillator in response to the second signal processed in a phase gain unit.

20. *(Currently amended)* The method of claim 19, ~~wherein the second signal, after processed in the phase gain unit, is converted to an analog signal~~ comprising converting the second signal, after processed in the phase gain unit, to an analog signal.

21. *(Currently amended)* The method of claim 19, ~~wherein the second modulation path provides a second input signal to the voltage controlled oscillator in response to the second signal processed in a phase offset unit~~ further comprising providing a second input signal in the second modulation path to the voltage controlled oscillator in response to the second signal processed in a phase offset unit.

22. *(Currently amended)* The method of claim 21, ~~wherein the second modulation path is formed by a phase-locked loop (PLL) including an adder that couples both the first and second input signals to modulate the voltage controlled oscillator~~ further

comprising forming the second modulation path by a phase-locked loop (PLL) that is formed by an adder adding an output of a loop filter with a phase gain to modulate the voltage controlled oscillator.

23. *(Currently amended)* A method for controlling a transmitter to operate in a switching-mode, the method comprising:

compensating a frequency drift and other non-linear effects of a modulated voltage-controlled-oscillator (VCO) and a power amplifier by predistorting a baseband amplitude signal and a phase signal in accordance with one or more distorting parameters that are determined based on a sample of an output of the transmitter, wherein the baseband amplitude signal and the phase signal have been decomposed in terms of polar coordinates;
providing a phase-locked loop (PLL) with an adaptive phase gain and a phase offset control in response to the phase signal; and
modulating the power amplifier with the baseband amplitude signal and an output coupled from the modulated voltage controlled oscillator (VCO).

24. *(Original)* The method of claim 23, further comprising:

demodulating samples of an output of the power amplifier and the modulated voltage controlled oscillator to regenerate a first signal, a second signal and a third signal in a digital format;
comparing the demodulated first and second signals to the baseband amplitude signal and phase signals with reference to the third signal, respectively; and
producing feedback control signals to update the one or more distorting parameters, and other related parameters.

25. *(Original)* The method of claim 24, still further comprising equalizing a delay time between the baseband amplitude and phase signals.

26. (*Original*) The method of claim 25, wherein the delay time is provided by one of the feedback control signals.

27. (*Currently amended*) The method of claim 23, wherein the phase-locked loop (PLL) comprises:

- the voltage-controlled oscillator (VCO) with a control input and a phase-modulated output;
- a phase detector to compare two phase-modulated signals and produce an output representing the phase difference of the two phase-modulated signals;
- a loop filter coupled to the output of the phase detector and to the input of the VCO;
- a feedback loop including a feedback frequency divider which is coupled to the output of the VCO ~~and to an input of the phase detector~~;
- a reference frequency signal coupled to another input of the phase detector; and
- a modulator receiving a signal from an adder that couples a phase-modulated baseband signal and a carrier frequency signal together to produce a digital bit stream used to control a divisor of the feedback frequency divider.

28. (*Previously amended*) The method of claim 23, wherein a controller receives a phase-modulated baseband signal and a carrier frequency signal to produce a digital bit stream used to control a reference frequency coupled to an input of a phase detector.

29. (*Currently amended*) The method of claim 23, wherein the VCO operates by:

- coupling the phase-modulated baseband signal to an input node of the VCO which is used by the phase-locked loop;
- using an adaptive phase gain to scale the phase-modulated baseband signal before being coupled to the input node of the VCO of the phase-locked loop;
- using an adaptive phase offset to change the phase-modulated baseband signal which is ~~applied~~ coupled to the input of a controller of ~~a~~ the phase locked loop; and

using adaptive digital predistortion to generate the adaptive phase gain and phase offset signals.